ARVO 2020

View Abstract

CONTROL ID: 3365720

SUBMISSION ROLE: Abstract Submission

AUTHORS

AUTHORS (LAST NAME, FIRST NAME): Soliz, Peter[1]; Zamora, Gilberto[1]; Aslan, Joe[2]; Nemeth, Sheila C.[1]; Benson, Jeremy[1]; Burgess, Philip[2]

INSTITUTIONS (ALL): 1. VisionQuest Biomedical, Albuquerque, NM, United States.
2. Faculty of Health & Life Sciences, University of Liverpool, Liverpool, United Kingdom.

Commercial Relationships Disclosure (Abstract): Peter Soliz: Commercial Relationship(s);VisionQuest Biomedical Inc.:Code E (Employment);VisionQuest Biomedical Inc.:Code I (Personal Financial Interest) | Gilberto Zamora: Commercial Relationship(s);VisionQuest Biomedical Inc.:Code E (Employment) | Joe Aslan: Commercial Relationship: Code N (No Commercial Relationship) | Sheila Nemeth: Commercial Relationship(s);VisionQuest Biomedical Inc.:Code E (Employment) | Jeremy Benson: Commercial Relationship(s);VisionQuest Biomedical Inc.:Code E (Employment) | Philip Burgess: Commercial Relationship: Code N (No Commercial Relationship)

Study Group: (none)

ABSTRACT

TITLE: Impact of Artificial Intelligence for Diabetic Retinopathy Screening in a Malawi, Africa Clinic

ABSTRACT BODY:

Purpose: To investigate the relevance of an artificial intelligence (AI)-based diabetic retinopathy (DR) screening system coupled with a low-cost, hand-held fundus camera for meeting the diabetes care needs in a Hospital setting in Malawi, Africa.

Methods: This investigation was a retrospective study of the performance of an AI software, EyeStar from VisionQuest Biomedical, to screen for referable DR using mydriatic images from a low-cost, hand-held, fundus camera, Pictor Plus, and secondarily using a smartphone-based mydriatic retinal camera, iNview, both from Volk Optical. Subjects were enrolled at the Lions Eye Unit, Zomba Central Hospital Zomba, Malawi, between December 2018 and March 2019.
The study enrolled N=122 subjects. Two images of the right eye were collected: one fovea centered and one

optic disc centered. Eyes were pharmacologically dilated. All subjects were imaged with the Pictor camera and a subset of 36 with the iNview. The images were processed using the AI screening software which produces a “refer” or “non-refer” recommendation. The “refer” category corresponds to severe non-proliferative DR (NPDR) or proliferative DR (PDR). The “non-refer” category corresponds to no DR, mild NPDR, or moderate NPDR. The training of the AI software did not include images from the Pictor Plus. The performance of the AI software was assessed for sensitivity and specificity to detect referable DR using a certified reader as the reference standard. The Pictor test data included 88% with non-referable DR; and 12% with referable DR.

Results: N=116 of the N=122 subjects had images from the Pictor Plus camera with sufficient quality for human reading to determine the level of DR. These 122 were presented to the AI software, which found 11 did not meet the quality requirements for an accurate prediction of DR grade. Without training on iNview images, the AI software processed successfully 20 cases. The Pictor achieved a sensitivity and specificity of 92% and 90% respectively, while the iNview achieved 100% and 76%.

Conclusions: This study demonstrates the potential for the smartphone-based cameras to meet the needs in countries in terms of cost, iNview (<$1,000) and Pictor Plus ($10,000), and performance. With experience, the later stages of the study showed significantly reduced rejected images for quality.

(No Image Selected)

DETAILS

PRESENTATION TYPE: Poster Only
CURRENT REVIEWING CODE: 2390 Imaging: Image processing and interpretation - MOI
CURRENT SECTION: Multidisciplinary Ophthalmic Imaging Cross-sectional Group
Clinical Trial Registration (Abstract): No
Other Registry Site (Abstract): (none)
Registration Number (Abstract): (none)
Date Trial was Registered (MM/DD/YYYY) (Abstract): (none)
Date Trial Began (MM/DD/YYYY) (Abstract): (none)
Grant Support (Abstract): Yes
Support Detail (Abstract): NIH grant EY018280, Global Challenges Research Fund (GCRF)

TRAVEL GRANTS and AWARDS APPLICATIONS

AWARDS:

AFFIRMATIONS

Affirmations: Affirmation of compliance with ARVO’s Statement for Use of Animals.
Affirmations: Affirmation to reveal essential structure, novel compound elements, or identify new gene compounds.

Affirmations: Affirmation of compliance with ARVO's Statement for Use of Human Subjects and/or Declaration of Helsinki.

Affirmations: Affirmation of copyright transfer from each author to ARVO, or certification of public domain abstract.

Affirmations: Affirmation that submission of this abstract has been approved by the Principal Investigator.

Affirmations: Affirmation of compliance with ARVO policy on registering clinical trials.

Affirmations: Affirmation to present same work as abstract submission.

Affirmations: Affirmation that abstract data/conclusions have not been published; not redundant with other submissions from same investigators.

Affirmations: Affirmation to pay Annual Meeting's full registration fee.